

The patient was placed upon a general tonic course of treatment, advised to live in the open and remain quiet as long as the bladder gave distress.

Intramuscular injections of a soluble mercury preparation were given, alternating with the administration of sodium iodide. Locally bladder irrigations of a one-half per cent solution of phenol were used, alternating with instillations of iodoform in olive oil. Use was also made of either urotropin or salol.

There was an improvement from the start, and at the end of six months the bladder ulceration was healed and comparative comfort established. The urine quantity was also quite normal and with better color, specific gravity, and very little organic sediment.

Tuberculin injections were then begun and have been continued to the present time, a period of six months. With intervening periods the mercury injections have also been continued.

At the present time the patient is progressing nicely and is practically free from all bladder symptoms. The urine is normal in quantity, being passed at intervals of two or three hours in the day and twice at night, but it still shows cellular elements in excess. She has gained about twenty pounds in weight. It is probable there will be a cure, though as yet she has not attained that desirable state.

THE THEORY AND THE VALUE OF TUBERCULINS.*

By EDWARD VON ADELUNG, M. D., Oakland.

In the following ten-minute paper, although I shall discuss cursorily the theory of the action of tuberculins and their value in diagnosis and treatment, I shall have to omit discussion of dosage, intervals between doses, indications and contra-indications, and the other therapeutic details, because that subject would include so many particulars, all of which are important, that it cannot be dealt with except at length.

When the human organism is the subject of certain infections such as diphtheria, we have a localized process which generates toxins which circulate in the blood-stream. The fever, weakness, depression, paralysis, and other general symptoms are the expression of the toxemia. The injection of the specific antitoxin neutralizes the toxin, the symptoms disappear, and the patient gets well.

When the human organism is the subject of certain other infections, notably tuberculosis, the case is quite different; here we have notable differences. The diphtheria antitoxin is soluble in blood; the tubercular antitoxin is insoluble in blood, and therefore impracticable. The pathological process too is different: instead of fighting in the open, the enemy attacks from a fortified position. The invading organism is enclosed within the firm walls of a tubercle. In tuberculosis this investing barrier prevents more or less successfully both egress and ingress—the egress of the bacilli and their products; the ingress of antitoxic and bacteriolytic agents.

This condition of affairs, it is readily seen, hinders the system generally from earning its immunity, for only those cells directly concerned with the tubercle formation are in a position to receive the necessary stimuli that develop immunity. It is further conceived that later, in unfavorable cases

when the defensive wall fails to perform its protective function, the tissue cells of the whole body are subjected to such doses of tubercular toxins and at such unfavorable times, that they are overwhelmed instead of immunized. Baldwin puts it in these words: "The tissues in general experience but slight effect from the presence of a few tubercle bacilli well localized, and there results a lack of effective resistance from absence of a general stimulus at favorable moments in most cases of chronic tuberculosis. The ultimate result consequently often depends on the efficiency of the cell nutrition throughout the body to bear repeated severe exposures without harm." This is evidenced by the state of affairs observed in those cases of immunity resulting from a previous attack of tuberculosis—cases that we refer to as arrested. Such persons frequently continue the subjects of secondary anemia, disordered digestion, imperfect assimilation, and consequent tissue vulnerability. Such persons are liable at any time to suffer another attack.

In the presence of forces that tend toward such a predicament, and recalling the pathology of the tubercle, tuberculin offers some rational hope of escape. It does so by offering an artificial means for immunization of the general tissue cells, those not directly concerned in the tubercle formation. This procedure, as at present practiced, is not absolute in its results, is explained by theories and not by known processes, is open to the criticism of exact science to some extent, and yet has a definite valued place in scientific medicine.

Some have turned to sero-therapy, convinced that tuberculosis is to be conquered with the same weapons that controlled diphtheria. And although the acumen of such men as Trudeau, Baldwin and notably Maragliano has been brought to bear on the problem, nothing convincing has thus far been presented. Organotherapy likewise has failed.

The fact seems to be fairly clear, that in order to fight the tubercle bacillus successfully by artificial immunization, it is necessary to employ not only a stimulus to the formation of antitoxins, but stimulants to the bacteriolytic and phagocytic functions as well. In searching for such agents we naturally turn to the tubercle bacillus itself, for it stands to reason that they must be found within the specific bacillus and its products.

But since these various elements have thus far escaped the scrutiny of the laboratory analyst, since they have not yet been differentiated, we are still unable to choose those parts of the bacillus and of its products that are the essential immunizing elements. Is it the proteids? Is it the waxy coat that envelopes the bacillus and renders it acid-fast? Is it a carbohydrate? Is it the nucleic acid or one of its compounds? Or is it one of the many products resulting from the decomposition of the bacilli? As yet, no one can answer.

Hence in the manufacture of tuberculin, many methods have been followed, according to the various theories of the producers. The many tuberculins that have been offered the profession may be divided into two kinds: those that do not contain insoluble elements, and those that do contain insol-

* Read before the Alameda County Medical Society.

uble elements. The latter include the vaccines and emulsions. Tuberculins are prepared from either the human or the bovine type of the bacillus. The auto genetic tubercle vaccine, although theoretically correct, fails clinically.

The term "tuberculin" originated with Koch, who applied it to his first product, a filtered, concentrated, boiled broth of full-grown human bacilli. This was known as Koch's Old Tuberculin; later, Koch changed his technic; he took his bouillon culture, removed the bacilli, dried and pulverized them, mixed them with water, and centrifuged. The upper watery extract is known as T. O. (Tuberculin Oberst), referring to the upper portion; the lower, slimy, more solid part is known as T. R. (Tuberculin Residuum) referring to the residue.

This latest and still bolder product is B. E. (Bacillus Emulsion), which is a suspension in glycerin solution of the entire substance of the bacilli after pulverizing. Only the coarser particles are refused. The glycerin is depended on to sterilize any bacilli that escape pulverization. This being somewhat dangerous, some manufacturers secure sterilization by heating this product.

Beranek invented a complicated chemico-physical process too long even to sketch here.

Trudeau attempted to precipitate the active principles by chemicals. Maragliano prepared a watery extract by heating the bacilli for a long time in water, and filtering. Hahn, desiring to get an extract of the bacillus unchanged by heat or by chemical action, simply expressed the juice from a mass of live bacilli. Denys used the unaltered filtrate from both cultures. A score or more different processes for preparing tuberculin might be enumerated.

Suffice it to say that all tuberculins contain the peculiar nuclein, or its derivatives, which is supposed to be the active principle of the bacillus.

All tuberculins produce the characteristic reaction when injected. Inasmuch as a similar reaction is obtained by injecting other nucleo-proteids, yeast nuclein, albumoses, cinnamic acid, and some other substances, the reaction can not be regarded as entirely specific.

This confusion of tuberculins leads to the frequent query, which tuberculin is the best? No satisfactory reply can be given. The question is unsettled. Certainly the ideal tuberculin has not yet appeared. Still, it is well known that some tuberculins are more toxic than others. Guinea-pigs are killed by much smaller doses of T. O. than of B. F. Undesired reactions do not occur so frequently and are not so severe with B. F. as with T. O. Therefore B. F. is probably a better tuberculin for those who are beginning tuberculin work, better for those unfamiliar with the early signs of threatened reactions, better for those who are inexperienced in the use of tuberculins, and who would therefore profit by a wider margin for errors in technic. It is safer than the emulsions and is probably as safe a product as the market offers. Sahli states what is undoubtedly true, that the qualifications of the physician who administers it are certainly of more importance than the quality of the tuberculin. Being

ignorant as to which parts of the bacillus or of its products are the essential therapeutic elements, some clinicians are now employing an emulsion of tubercle bacilli in the bouillon filtrate. Furthermore, there seems to be some evidence of an antagonism between the bovine and the human bacilli products, which has led some operators to use the bovine tuberculins in human treatment.

The value of tuberculin is mainly twofold: diagnostic and therapeutic. True it is that some claim a prognostic application, and some a prophylactic use. But these claims are as yet insufficiently supported.

For diagnosis there are several tests: Moro's percutaneous or inunction test; von Pirquet's cutaneous or scarification test; Calmette's (or Wolff-Eisner's) conjunctival test; Detre's differential test, a modification of von Pirquet's; Koch's subcutaneous test, and others of less repute. The last, the subcutaneous, is the only one which has been satisfactorily interpreted—the only one that yields fairly definite information.

Though lack of time forbids a description of these tests and a discussion of their relative values, I will mention that many practitioners reject the conjunctival test as not free from danger to the eye. The employment of the von Pirquet and Moro tests is very common, although their exact values have not been fixed, but they are entirely safe. Still more uncertain is the claim that prognosis is defined by the character and time of appearance of the reaction to these tests, these observations being rather too indefinite for dependence.

Klebs regards the subcutaneous diagnostic test as approaching very closely in value the finding of tubercle bacilli in excretions and tissues, but he warns against its promiscuous employment. He is inclined to abandon the conjunctival test altogether. Bonney states that he has procured results with it that were impossible by the hygienic-dietetic method. Dr. Minor, after years of conservatism, has finally adopted tuberculin. I think all of the important tuberculosis sanatoria employ it.

The consensus of opinion of experienced bacteriologists and practitioners seems to me to be fairly presented in the following resume:

Resume.

1. Tuberculin acts by stimulating the body cells to perform their immunizing functions.
2. The essential constituents of tuberculin are not defined, but include the proteid-nuclein of the tubercle bacillus.
3. All tuberculins produce the characteristic reaction.
4. Bouillon Filtre is one of the safest tuberculins for beginners.
5. Of the diagnostic tests, Koch's subcutaneous test is by far the most reliable. Its use is not free from danger.
6. The conjunctival test is too dangerous for general use, although fairly reliable to indicate a present or past infection.
7. Therapeutically administered by experienced persons, tuberculin is a valuable adjunct to the

treatment of tuberculosis. Under proper supervision it is practically harmless.

8. In glandular tuberculosis tuberculin is of signal value.

9. Experience and painstaking supervision are necessary to avoid injurious effects.

10. In general, the tuberculins are of definite value in diagnosis and therapeutics.

Discussion.

Dr. Martin Fischer presented a great variety of different pathological specimens embracing all the various forms of tuberculosis of the different organs, various forms of tuberculosis of the different organs. Some of the lesions were not discernible macroscopically, but could be plainly seen by section through the microscope. The lung specimens were especially interesting, embracing all the various stages up to cavity formation. Dr. Fischer stated that the percentage of tuberculosis found at autopsy was enormous, the great majority of all individuals at some time having had tuberculosis in some form. Many times this could not be diagnosed microscopically, but could be by the inoculation test. He thought that pneumonia was becoming a more dangerous disease than tuberculosis.

Dr. Emmet Rixford spoke on tuberculosis of bone, stating that it was extremely common, especially in the younger ages. The position of the tubercular lesion is more common to the epiphysis than the shaft of long bones, possibly because of its circulatory position. The lesion occurring in the form of a triangle would indicate emboli. Trauma may be considered, but not always the cause. Tuberculosis of the epiphysis very easily involves the joint. He doubts very much if there is such a thing as primary involvement of the synovial membrane, or of the cartilages. It is often impossible to locate the tubercular focus. Hyperemia treatment and tuberculin have come to stay. Probably Percival Pott was first to commence the hyperemia treatment by using a hot iron up and down the back in spinal trouble, causing a hyperemia; immobility was the treatment of old. Not free from danger. A certain amount of mobility is better. Hyperemia of Bier in orthopedic surgery has demonstrated its efficiency in tuberculosis of the extremities. Don't overdo the Bier method. Hyperemia nor stasis is the desired condition. When treating osseous tuberculosis, although the symptoms have disappeared, the patient is not necessarily well. It is a serious matter to operate on a hip joint that has been the seat of a tubercular infection.

Dr. Rixford presented a patient who had had a very extensive tubercular affection around the anus, having been operated on for this condition before. A complete excision of the tubercular area was made; recurrence took place. Patient was sent to the mountains. The spine later became involved and partial paralysis ensued. Tuberculin caused the paralysis to disappear. The wrist being involved, responded to the Bier treatment. The recovery in this case was credited to tuberculin and Bier treatment.

Dr. Chas. M. Cooper presented a number of X-ray plates, demonstrating the various stages of lung involvement in tubercular lesions, as well as bone and other different organs.

The doctor described the method of interpreting X-ray plates and the manner of detecting various pathological lesions. By this method lesions were often detected which gave no clinical symptoms. A number of plates showing stone in the kidney and ureters were also presented.

Dr. S. H. Buteau, in discussing genito-urinary tuberculosis, said that finding tubercle bacilli in the urine did not always indicate kidney involvement; when this was accompanied by the classical, clinical symptoms of a kidney lesion, then we should make

the diagnosis. He thought it possible by too frequent catheterization of a non-infected ureter to infect a non-infected kidney. Tuberculosis of the bladder in his experience was generally secondary to a kidney lesion. Tuberculin will aggravate tubercular symptoms, especially if the kidney is involved. He thought the Harris segregation a much safer instrument for the general practitioner. Tuberculosis of the kidney does not always mean removal of the same. Some of the newer remedies should be instituted first.

Dr. Geo. Evans commended the splendid work Dr. Cooper was doing with the X-ray, but thought a great many of these conditions should be diagnosed clinically. The fact that these conditions can be demonstrated with the X-ray should stimulate us to more accurate diagnosis. Speaking of tuberculin administration, he thought it was being handled too loosely. We are now on the threshold of a specific treatment of tuberculosis. Tuberculin is still a two-edged sword. Local reaction at signs of injection is a good guide to index of dosage. Small doses safest. Reaction of bovine and human tuberculin are generally antagonistic.

Dr. L. Loran Riggin closed the discussion. He stated that he had secured two positions for patients with pulmonary tuberculosis in the dynamo room of the electric power company. The ozone in this department is very apparent; both patients have greatly improved.

THE IMMEDIATE REMOVAL TREATMENT OF MORPHIN HABITUATION.*

By R. E. BERING, M. D., Tulare.

At our meeting held at Riverside in '05 I presented a short paper on the method of treating patients with hyoscin hydrobromate for the morphin habit. At that time I gave the members all the information I then possessed. During the time that has intervened I have received many letters from different sections of the country asking for more detailed information. The purpose of this paper is to provide such information as has grown out of my own increased experience and to present it to you as clearly as possible that you may the more successfully use the treatment in your own practice.

In order that you may observe a practical demonstration of this method the Santa Clara County Hospital has placed at my disposal the facilities of the hospital where you will find two patients under course of treatment. One is a morphin patient provided by Dr. H. B. Gates. This patient has used the drug for fifteen years. The other is a victim of cocaine who has been in the habit of using sixty grains of the drug daily. You are cordially invited to visit these patients at your convenience.

The treatment of the morphin habit is divided into three distinct periods, each of which is equally important. We may designate these periods as, first, the period of preparation; second, the period of treatment with hyoscin; third, the period of convalescence.

I shall attempt to present briefly what my own experience has shown to be the most effective method during each of these periods.

In treating a case of morphin habituation it is very necessary to gain the confidence of the patient. If

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